



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 709 911 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
06.08.1997 Bulletin 1997/32

(51) Int Cl.⁶: **H01P 1/12, H01P 1/18,
H01P 9/00**

(43) Date of publication A2:
01.05.1996 Bulletin 1996/18

(21) Application number: **95307675.9**

(22) Date of filing: **27.10.1995**

(84) Designated Contracting States:
DE FR GB IT NL

(30) Priority: **31.10.1994 US 332282**

(71) Applicant: **TEXAS INSTRUMENTS
INCORPORATED
Dallas Texas 75265 (US)**

(72) Inventors:
• Goldsmith, Charles L.
Plano, TX 75023 (US)
• Kanack, Bradley M.
Desoto, TX 75115 (US)
• Lin, Tsen-Hwang
Dallas, TX 75252 (US)

• Norvell, Bill R.
Richardson, TX 75080 (US)
• Pang, Lily Y.
McKinney, TX 75070 (US)
• Powers, Billy B., Jr.
Richardson, TX 75080 (US)
• Rhoads, Charles M.
McKinney, TX 75050 (US)
• Seymour, David J.
Plano, TX 75074 (US)

(74) Representative:
**Blanco White, Henry Nicholas et al
ABEL & IMRAY
Northumberland House
303-306 High Holborn
London WC1V 7LH (GB)**

(54) **Improved switches**

(57) Micromechanical microwave switches with both ohmic and capacitive coupling (802, 812, 803) of rf lines and integration in multiple throw switches useful in microwave arrays.

The invention can be embodied in the form of a

phase shifter, a time delay network, a filter selective network or in an integrated circuit.

The invention has advantages including switches with no power consumption, low cost, linearity and also compatibility with both Silicon and Gallium arsenide integrated circuits.

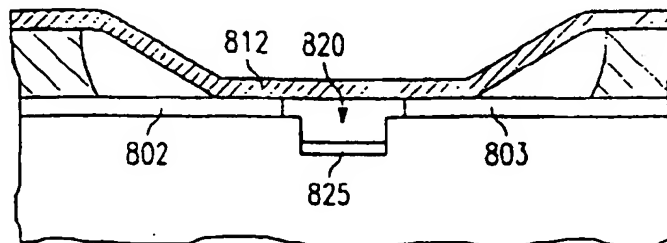


FIG. 8b

EP 0 709 911 A3

BEST AVAILABLE COPY



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 7675

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 5 258 591 A (BUCK) 2 November 1993 * column 1, line 50 - line 60 * * column 2, line 29 - line 31 * * column 3, line 29 - column 4, line 25; figures 1,2 * ---	1,2	H01P1/12 H01P1/18 H01P9/00
Y	US 4 405 907 A (BREESE ET AL.) 20 September 1983 * column 2, line 58 - column 3, line 23; figure 4 * ---	1,2	
X	US 5 051 643 A (DWORSKY ET AL.) 24 September 1991 * the whole document *	7	
Y	---	3-6	
Y	US 4 779 097 A (MORCHIN) 18 October 1988 * column 3, line 44 - line 63; figure 5 * ---	3,4	
Y	FR 2 539 933 A (THOMSON-CSF) 27 July 1984 * page 5, line 28 - page 6, line 18; figure 4 * ---	5,6	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
X	WO 94 18688 A (BROOKTREE CORPORATION) 18 August 1994 * page 6, line 31 - page 12, line 24; figures 1-3 * ---	7	H01P H01H H01Q
	-/--		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 June 1997	Examiner Den Otter, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document			

EPO FORM 1503 (1.1.93) (P04001)

BEST AVAILABLE COPY



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 7675

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PROCEEDING OF THE WORKSHOP ON MICRO ELECTRO MECHANICAL SYSTEMS (MEM, OISO, JAN. 25 - 28, 1994, no. WORKSHOP 7, 25 January 1994, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, pages 97-101, XP000528400 GRETILLAT M -A ET AL: "ELECTROSTATIC POLYSILICON MICRORELAYS INTEGRATED WITH MOSFETS" * page 97, right-hand column, line 24 - page 98, line 9; figure 1 *	7	
P,X	IEEE MTT-S INTERNATIONAL MICROWAVE SYMPOSIUM DIGEST, ORLANDO, MAY 16 - 20, 1995, vol. 1, 16 May 1995, KIRBY L (ED), pages 91-94, XP000538549 GOLDSMITH C ET AL: "MICROMECHANICAL MEMBRANE SWITCHES FOR MICROWAVE APPLICATIONS" * the whole document *	1-7	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search THE HAGUE		Date of completion of the search 17 June 1997	Examiner Den Otter, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure F : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : member of the same patent family, corresponding document</p>			

EPO FORM 1503 (04.91) (P/0401)

BEST AVAILABLE COPY